
MARCH 1982

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Item 15-D

RECEIVED

AUG 30 1983

STATE OF UTAH
MINING AND RECLAMATION PLAN

DIVISION OF
OIL, GAS & MINING

1. Name of Applicant or Company

Anaconda Minerals Company
555 Seventeenth Street
Denver, Colorado 80202

*affiliated Mining Inc.
555 First Security Bldg
Salt Lake City, Utah 84111*

2. Proposed Type of Operation

Reprocessing of existing tailing and mine dump material, and possibly locally obtained mine ore (in limited quantities), by means of a ~~cyanide heap~~ ^{flotation-cyanide} leach process for the recovery of gold and silver values.

3. a. Prior Land Use(s)

Grazing, smelting, milling.

b. Current Land Use(s)

Grazing, slag dump, and mill tailings storage.

c. Possible or Prospective Future Land Use(s)

Grazing, wildlife habitat.

4. What Vegetation Exists on the Land Proposed to be Affected?

Sagebrush, rabbit brush, grasses, pinyon pine, juniper, forbs.

a. Types of Estimated Percent Cover or Density:

Variable: pinyon and juniper, - 0% to 60% cover; sage and rabbit brush - 20% to 80% cover.

5. What is the pH Range of Soil Before Mining?

Areas immediately surrounding the existing tailing pile and areas to be used for leach pad construction have soils with pH ranging from 7.8 to 8.8 based on numerous samples obtained in the upper 25 foot horizon. From surface to 3 feet in depth, the pH shows a variability of from 7.8 to 8.4. The tailing material itself has a pH of 7.2.

Name of Person or Agency and Method of Determining pH

Front Range Labs, Inc. of Fort Collins Colorado performed the pH determination, utilizing the paste technique with pH meter.

6. Site Elevation Above Sea Level

Approximately 6000 feet above sea level.

7. N/A

8. Estimated Duration of Mining Operations

Two to five years.


Is There Any Discharge of Water From Abandoned Deep Mines On
or Crossing the Land Affected?

No.

11. Describe Specifically a Detailed Procedure for:

a. The Mining Sequence

The proven ore reserves consist of 300,000 tons of tailing, the product of a chloride roast - jig wash milling operation that was in production during the period 1908-1915 on the subject site. In addition, approximately 100,000 tons of smelter slag are present, at the current time considered uneconomic for treatment. Several mine dumps from previous operations in the district during the late 1880's to early 1900's also are present and are being evaluated for ore potential. There exists also the possibility of minor amounts of "toll" ore availability during the proposed operational period as several major mining companies are beginning exploration programs within the district along with small leasors.

The main ore reserve, hereinafter referred to as the "ore tailing", was deposited in slurry form into its present state, that being a conical pile approximately 75 feet in height and approximately 500 feet in diameter at its base. An additional area about 500 feet square (effectively) varies in height from 0 to 30 feet, benched from previous "mining" for use as a smelter flux, this having occurred in the late 1960's and early 1970's. Refer to  for a plan view of the ore tailing deposition.

The previously mentioned smelter slag underlies the ore tailing pile in its central portion and is exposed in two

slag dump "runs" on the north and south sides of the pile. Inasmuch as the site has been placed on the National Register of Historic Places (see [REDACTED] in Appendix), recorded as the "Tintic Smelter Site", the slag remnants will be left in place upon cessation of the operation. In addition, all foundations and remnants of the old Tintic Smelter and Tintic Mill will be left intact for historical preservation purposes. Anaconda may, at some future date, elect to eliminate or minimize "liability hazards" on the site through methods that will achieve the end goal, yet allow the site to retain maximum characteristics of historical significance. These methods may include backfilling deep holes and/or fencing to minimize risk of bodily injury. As plans are developed for eliminating or minimizing these hazards, Anaconda will coordinate with the Utah State Historical Society and Tintic Historical Society to develop a plan suitable for achieving both Anaconda's and the Societys' goals.

Mining

Mining of the ore tailing will occur in the following manner. Front end loaders will excavate the material from the pile and dump into a feed hopper. The hopper will feed a crusher (roll crusher or impact) that will reduce the material to one hundred percent minus ten mesh. Crushing will be minimal as the material is presently sixty five percent minus ten mesh. The desired product will have freshly exposed surfaces to enhance the material's leaching characteristics. [Lime (approximately 10 lb/ton), sodium cyanide (approximately 0.5 lb/ton), and water (approximately 14% moisture content) will be mixed with the ore immediately after the ore is discharged from the crusher onto the tail conveyor. The

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addition of these items in combination with the ore passing over conveyor transfer points enroute to the ore stockpile will effect an agglomeration of fines particles to the large particles that will enhance percolation and leaching characteristics of the final heap. The agglomerated ore will be discharged into a small stockpile area where it will "cure" for 24 hours before being taken to the heap. The stockpile area and areas under reagent addition points along the crusher discharge conveyor will consist of a four inch thick compacted clay liner to contain any minor amounts of the reagents that could potentially enter the environment. Due to the fact that cyanide will be contained within the agglomerate rather than being present in solution form (standing water), the clay liner will be sufficient for containment. In addition, the agglomeration period is expected to last no longer than 60 to 90 days, after which the liner will be excavated and placed within the contained area near the heaps. This area is designed to channel runoff around it by diversion and runoff within it is channeled to the barren solution pond. *print*

From the agglomerated ore stockpile, the ore is loaded into rear dump trucks by a front end loader and transported along the haul route indicated in ~~the plan view~~. It is proposed that Anaconda seek approval from Juab County for closure of that portion of the public road connecting U. S. Highway 6 & 50 with the road continuing on to Silver City for the duration of the heap construction period (60-90 days), in the interest of public safety. At least two other access roads to Silver City exist and would not be affected by Anaconda's operations. The trucks will haul to ramps constructed at the high (elevation) end of the leach pad, ramp up and dump the ore onto the repose face until a sufficient tonnage is on the

leach pad to be dozed into the desired heap configuration (a separate section covering leach pad and heap construction follows). The heap will be constructed in panels approximately 140 feet wide and 700 feet long to enable leaching to begin prior to completion of the entire heap.

Leaching

A network of PVC piping will be layed across the heap surface to distribute a dilute cyanide solution, through sprinklers, to the heap surface. It is proposed that a type of sprinkler head such as the Wobbler or Wiggler be used to enable solution droplets to be as large as possible and delivered as close to the heap surface as possible. An additional benefit of this type of spray characteristic is that vulnerability to wind loss and subsequent possible contamination of the environment is minimized.

The dilute cyanide solution will percolate through the heap utilizing the permeability characteristics created by the agglomeration process. Gold and silver values in the ore will be dissolved into the cyanide as the solution migrates downward, by gravity flow, eventually reaching the pad underlying the heap. The pad, constructed of an impermeable synthetic liner, will be sloping at about a 4% grade in the direction of the pregnant solution collection pond. A network of cross channels under the heap will reduce the distance the solution is required to travel under the heap by channeling it outward to solution collection channels alongside the heap. Both the cross channels and collection channels will also be lined with a synthetic liner. It is proposed that solution be applied to a

small

given heap section for approximately one shift (8 hours) every fifth day or whatever interval is proven in operation that will produce the desired solution strength. Laboratory testing has indicated that due to the relatively low grade of ore, it is necessary to maximize solution grade (silver and gold values) to maximize end recovery of the silver and gold. Solution application rate will be low, approximately 0.0045 gpm/ft² maximum, with makeup solution containing about 4 pounds sodium cyanide per ton to maintain about 0.3 gpl free cyanide in the recycle solution. Leach time for the ore is expected to be two leach (summer) seasons based on a five day week, one shift per day leaching operation. *shift*

Once the pregnant solution enters the collection channels, it flows into the pregnant solution pond for storage prior to entering the Merrill-Crowe recovery plant.

Precipitation Plant Operation

The solution collected in the pregnant solution pond is then pumped to the precipitation (Merrill-Crowe) plant. The solution is stored in a feed tank and pumped to clarifier presses to filter impurities from the solution. Diatomaceous earth is used to pre-coat the filters and prevent early clogging. The presses operate at a pressure of approximately 100 pounds per square inch, forcing the solution through filter cloth. This process supplies clear solution to the deaerator (which is a pressure vessel filled with plastic material to slow the flow of solution and distribute it over a large surface area thus allowing entrained oxygen to escape). The oxygen is removed by a vacuum pump which keeps the deaerator under negative pressure. Zinc dust is then *shift*

added to the solution to precipitate the gold and silver. Removal of oxygen from the solution is necessary to ensure thorough precipitation. The flow of solution to the clarification presses is controlled by a D.P. (differential pressure) cell in the deaerator which maintains a level control of solution. The D.P. cell measures the differential pressure or, head of water, and sends a signal to an electronically controlled valve to regulate flow. A flow meter records solution flow. The solution containing the precipitate is pumped to precipitation presses by a flooded pump (to prevent oxygen from entering the solution through the pump). The precipitate forms a cake on the filter cloth in the press and is removed by compressed air blown through the press and scraped off the cloth when pressure buildup indicates reduced passage of solution. The precipitate is caught in pans, dried in a drying oven, and stored in sealed drums. The precipitate is saleable and Anaconda's intention is to market it in this form. It is possible to smelt the precipitate on-site in an induction furnace by adding proper fluxes to slag off impurities and produce Dore metal of 90% plus purity for sale to a refinery. If, at a future time, Anaconda decides to produce Dore metal, description of the process and application for appropriate permits will be submitted.

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The barren solution from the presses is collected in a reagent mix sump where the pH is adjusted with sodium hydroxide and cyanide strength adjusted by addition of sodium cyanide. The solution is then discharged to the barren solution pond and recirculated to the sprinklers on the heap. The leaching of the heap, with precipitate removal in the plant, is essentially a closed circuit operation with water being added to replace evaporation.

b. The Procedure for Constructing and Maintaining Access Roads to Include a Typical Cross-Section and a Profile of the Proposed Road Grades

No formal road building is foreseen for the project. Where necessary to conduct operations, grader constructed roadways will be made and these will generally be one to two lanes in width, crowned for drainage, and compacted for stability. These will be kept to a minimum and will be in the immediate vicinity of the proposed plant site for operational use only. General site access is adequately served by U.S. Highway 6 & 50.

c. The Procedure for Site Preparation Including Removing Trees and Brush

The proposed plant site and tailing disposal site are both substantially void of any trees. If trees are encountered, and it is not expected, they would be removed by dozer and disposed of properly. Some brush is evident in these areas and it is of low growth dimensions. As such, it would be removed as part of the topsoil removal phase. All other areas would be left undisturbed.

d. The Method for Removing and Stockpiling Topsoil or Disturbed Materials

Disturbed areas will be stripped of all topsoil (defined as upper horizon soil suitable for seedbed material) by means of rubber tired scraper, either elevating or conventional, or other suitable equipment. This seedbed material will be stockpiled by the scrapers to minimize wind and water erosion and to preserve the seedbed material in usable condition. A quick growing cover of vegetation will be established over the stockpile.

e. The Method for the Placement or Containment of All Disturbed Materials, to Include the Method for Handling of All Acid or Alkali-Producing and Toxic Materials

As stated, placement of disturbed materials will be by means of rubber tired scraper or other suitable equipment. Containment berms or "V"-ditches will be constructed around stockpiles to eliminate the possibility of sedimentation of natural drainage basins resulting from stockpile erosion. Materials that can be described as acid or alkali-producing or toxic will be placed or stored within the plant area which is designed as an included portion of the affected area subject to 25 year event design consideration. Any spillage or leakage of contaminants will be restricted (by diversion methods) to drainage into the barren solution pond. [REDACTED] indicates the area confined to drain into the barren solution pond.

f. A Procedure for Final Stabilization of Disturbed Materials

Areas of disturbance will be re-covered with topsoil from appropriate stockpiles to a suitable depth for revegetation. The revegetation will follow the plan described in the sub-category "Revegetation" in this application. Stabilization of suspected toxic substances (i.e., cyanide leach tailings) will be such that the material will be contained between a lower strata for synthetic liner, and an upper strata of cover, namely topsoil, and revegetated. Cyanide concentrations will be reduced to a minimum through the cyanide degradation processes covered in Section 2.e. All structures, foundations, and roadways relative to this operation, not to include

previously existing structures, foundations, and roadways, will be removed and the property will be regraded and revegetated to its approximate original topography and vegetative habitat wherever possible.

Grading and Regrading

Specifically Describe:

a. Typical Cross-Section of Regrading

Inasmuch as the local topography within the lease boundaries is topographically relatively flat, final reclamation of the site will be accomplished with the intention of returning the site to its approximate original contours. The area where the present (to be processed) tailing pile lies is substantially flat in terms of underlying natural ground and will be reclaimed in a like manner. The area where new tailing disposal will occur is flat, sloping topography and will be reclaimed in a like manner with the exception that the tract (expected to comprise approximately 15 to 20 acres) will experience a uniform rise in elevation of approximately 15 to 25 feet due to tailing deposition (heaps), stabilization, and subsequent cover of topsoil and vegetation over about one-half of the surface area.

b. The Method of Spreading Topsoil or Upper Horizon Material on the Regraded Area and Indicate the Approximate Thickness of the Final Surfacing Material

Replacement of upper horizon material will be accomplished by rubber tired scraper reclaim of stockpiled material and the material will be deposited or spread by scraper. Some areas may require additional dozing or shaping. It is expected that a minimum replacement zone would be approximately 4 to 8

inches in thickness in the new tailing area and that exposed ground created by removal of the existing tailing pile will be loosened by ripping or alternative methods and treated in a manner to stimulate the growth of a vegetative cover.

c. What Type of Soil Treatment Will Be Utilized

Following completion of the project, all disturbed areas will be fertilized and mulched with straw that will be crimped into the soil.

d. The Method of Drainage Control for the Final Regraded Area

The area to be occupied by the new tailing impoundment is a topographic low draining in a west-northwest [REDACTED] direction. It is naturally contained on the west side and north side by elevated road grades. Restructuring of the impoundment during reclaiming will include contouring to minimize or exclude the possibility of soil erosion by the implementation of containment berms, riprap or whatever is deemed necessary to accomplish this. Establishment of the vegetative cover will also aid in drainage control.

The area now occupied by the (ore) tailing, as stated, will be regraded to natural contours and prepared for a vegetative cover. This soil preparation will increase the run-off absorbing properties of the soil. In addition, a berm will be created immediately north of the existing pile to prohibit drainage migration into the Mammoth Gulch drainage which is tributary to Tanner Creek.

No significant drainage patterns will be altered in this operation due to the relatively small area being disturbed.

e. Maximum Grading Slope

It is expected that the maximum grading slope will occur as the side slopes of the new tailing impoundment (heap). These will be designed and constructed at a nominal 2.5:1 (horizontal:vertical) slope.

This slope will aid in minimizing disturbed area yet facilitate the establishment of a vegetative cover.

Testing

1. Describe Method for Testing Stability of Reclamation Fill Material

Reclamation fill material will not be used. Native soils will be used to cover the heap when leaching is completed. No stability tests have been run, due to its intended use as cover material rather than fill.

Describe Method for the Testing of Soil That is Intended to Support Vegetation

Soil, to be used as a top cover, and the tailing material itself, were analyzed in a soils laboratory (results are shown in [REDACTED] using standard soils tests for the following items:

| | | |
|--------|---------|-----------|
| pH | Texture | SAR |
| E.C. | % O.M. | C.E.C. |
| % sand | Ca | Total % N |
| % silt | Mg | P |
| % clay | Na | K |

2. Describe Any Soil Treatment Employed as an Aid to Revegetation

Soil treatments will include ripping of compacted areas followed by fertilization and straw mulching.

3. Describe Surface Preparation of Areas Intended to Support Vegetation

Surface preparation of areas intended to support vegetation includes:

- a. Grading, to produce a moderately level surface
- b. Native soil will be used to cover the tailing heap
- c. The locale where the tailings have been located and roads and other compacted areas will be ripped, graded, and covered with local native soils.
- d. Steep slopes will be graded to provide slopes no greater than 2.5:1 (horizontal:vertical).
- e. All disturbed areas will be fertilized and mulched with straw and seeded.

Revegetation

1. Revegetation to be Completed By:

- | | |
|--|---|
| <input type="checkbox"/> Operator | <input type="checkbox"/> Hydroseeding |
| <input type="checkbox"/> Soil Conservation District | <input type="checkbox"/> Aerial Seeding |
| <input checked="" type="checkbox"/> Private Contractor | <input checked="" type="checkbox"/> Conventional or Rangeland |
| <input type="checkbox"/> Other (Specify) _____ | <input checked="" type="checkbox"/> Broadcast and Drag |
| | <input type="checkbox"/> Other _____ |

2. Will Much Be Used? (X) Yes () No
Type: Straw or Meadow Hay Rate/Acre 4000 lbs

3. Revegetation Plan and Schedule

| <u>Species</u> | <u>Rate/Acre</u> | <u>Planting Location</u> | <u>Facing N-S-E-W</u> | <u>Season to be Replanted</u> |
|--------------------|------------------|--------------------------|-----------------------|-------------------------------|
| Big Sagebrush | 1 lb. | All areas | N/A | Spring |
| Rubber Rabbitbrush | 1 lb. | All areas | N/A | Spring |
| Crested Wheatgrass | 2 lb. | All areas | N/A | Spring |
| Yellow Sweetclover | 2 lb. | All areas | N/A | Spring |
| Alfalfa | 2 lb. | All areas | N/A | Spring |
| Western Wheatgrass | 2 lb. | All areas | N/A | Spring |
| Indian Ricegrass | 4 lb. | All areas | N/A | Spring |
| Wild Rye | 2 lb. | All areas | N/A | Spring |

4. Will Affected Area Be Subject to Livestock or Wildlife Grazing?

() Yes (X) No

Will Vegetation Protection be Needed?

No

5. Will Irrigation be Used: () Yes (X) No

6. Describe Maintenance Procedures for Revegetation If Needed, Until Surety Release is Granted

Revegetated areas will be examined regularly and soil samples will be taken yearly. If observation reveals poor vegetative cover, these areas will be reseeded. Soil samples will determine if ~~these~~ areas will require re-fertilization.